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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/017,642	12/14/2001	Rohit Ramani	1488.011US1	6405

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EXAMINER	
NG, CHRISTINE Y	

ART UNIT	PAPER NUMBER
2616	

DATE MAILED: 07/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/017,642	RAMANI ET AL.	
	Examiner	Art Unit	
	Christine Ng	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 May 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,8-10,12-14,19-21,26-29 and 33-36* is/are rejected.

7)☒ Claim(s) *4-7,11,15-18,22-25 and 30-32* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 December 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-3, 12-14, 19-21 and 26-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,922,390 to Chapman et al in view of U.S. Patent No. 6,587,437 to Lee et al.

Referring to claim 1, Chapman et al disclose in Figures 1 and 2 a method for providing a transport protocol within a network, comprising:

Receiving (at intermediate nodes) multiple packets (control packets), wherein each of the received packets includes a header and an associated sequence number (control sequence number), wherein the header includes an impending congestion indication (congestion stamp in congestion notification field). The nodes can detect and foresee congestion (impending congestion) in the future. Refer to Column 3, lines 25-36; Column 4, line 61 to Column 5, line 2; and Column 6, lines 12-39.

Monitoring the network for congestion caused by the received packets. Sender 104 sends packets with the congestion notification field set to "not congested"; an intermediate node on the path followed by the control packet can apply a congestion stamp to the control packet by setting the bits in the congestion notification field to "congested" to forecast congestion. Refer to Column 5, lines 12-32.

Marking (using congestion stamp) the header (congestion notification field) of some of the packets with an impending congestion indication based on the outcome of the monitoring. Refer to Column 5, lines 12-32.

Transmitting the monitored multiple packets through the network (from sender 104 to receiver 112). Refer to Column 4, lines 56-61.

Returning (from receiver 112) acknowledgements of receipt (outgoing control packets) for each of the transmitted packets, based on the sequence number (control sequence number) associated with each of the packets, and any associated marked impending congestion indication (congestion stamp in congestion notification field). Receiver 112 checks for control packets with congestion stamps and returns an outgoing control packet as an acknowledgement to sender 104. Refer to Column 5, lines 33-47.

Monitoring (at sender 104) each of the received acknowledgements (outgoing control packets) for the sequence number (control sequence number) and the marked impending congestion indication (congestion stamp in congestion notification field) associated with each of the received packets. Sender 104 receives the outgoing control packets from receiver 112, so that it is notified that congestion exists or is developing in the network. Refer to Column 5, lines 48-64.

Invoking a congestion control mechanism (adjustment of TCP-like adaptive window) to control a congestion window size which regulates the transmitted packets based on the monitoring of the acknowledgements (outgoing control packets) and the marked impending congestion indication. Sender 104 adjusts its TCP-like adaptive

window to control its data-sending rate according to the forecasted congestion. Refer to Column 3, line 65 to Column 4, line 30 and Column 6, lines 13-24.

Chapman et al do not disclose that the header includes a congestion alleviation indication and that after invoking a congestion control mechanism, further marking the header with a congestion alleviation indication.

Lee et al disclose a congestion control mechanism in which each network element can inform other network elements of congestion by setting the Explicit Forward Congestion Indicator (EFCI) bit in the header of each data cell. A network element in an impending congested state or in a currently congested state may set the EFCI bit. A network element that is not in a congested state or an impending congested state will not modify the value of the EFCI indication. If the EFCI bit is set, the system will lower its cell rate to control congestion. Once the congestion is alleviated, the EFCI bit will be set back to "0" to indicate that the network element is not in a congested state or will not be in a congested state. Refer to Column 2, lines 25-41 and Column 3, line 51 to Column 4, line 10. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include that the header includes a congestion alleviation indication and that after invoking a congestion control mechanism, further marking the header with a congestion alleviation indication. One would be motivated to do so in order to indicate to the network elements when the network is cleared of congestion, so that no more measures will be taken to reduce congestion.

Referring to claims 2, 13, 20, 27 and 28, Chapman et al disclose that the method further comprises:

Monitoring (Figure 4, steps 400, 402, 404, 406 and 408) the number of packets waiting in line (Figure 2, buffer 210) to be transmitted. Refer to Column 3, lines 36-57 and Column 7, lines 1-54.

Comparing (Figure 4, step 410) the number of packets waiting in line to a predetermined minimum line size (Figure 5, MINth) and a predetermined maximum line size (Figure 5, MAXth). If the virtual buffer fills above the threshold level, the sender invokes the congestion notification by marking an outgoing control packet with a congestion stamp. Refer to Column 7, 33-54. Furthermore, as shown in Figure 5, "the 100% fill of virtual buffer 210 is equated to the maximum threshold of RED (MAXth), while the minimum threshold (MINth) is calculated by subtracting the projected local requirement from MAXth...". Refer to Column 7, lines 55-67.

Referring to claims 3, 14, 21 and 29, Chapman et al disclose that marking the header of some of the packets with an impending congestion indication comprises:

If the number of packets waiting in line (Figure 2, virtual buffer 210) is greater than the predetermined minimum line size (Figure 5b, MINth) and less than the predetermined maximum line size (Figure 5b, MAXth), then marking (Figure 4, step 410) the header of some of the received packets based on a predicted determined probability (to increase the congestion marking probability) with an impending congestion indication (congestion stamp in congestion notification field). In Figure 5b,

the system is considered to be congested if the current fill is between the MINth and MAXth. Refer to Column 7, lines 55-67.

Chapman et al do not disclose that if the number of packets waiting in line is greater than the predetermined maximum line size, then the packets waiting in line beyond the predetermined maximum line size will be dropped.

However, Chapman et al disclose that in a standard routed network, "implementing congestion control involves the monitoring of the average buffer fill such that discard may be effected before the buffer overflows" (Column 1, lines 41-44). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include that if the number of packets waiting in line is greater than the predetermined maximum line size, then the packets waiting in line beyond the predetermined maximum line size will be dropped; the motivation being in order to prevent the buffer from overflowing.

Referring to claim 12, refer to the rejection of claim 1. Furthermore, as shown in Figure 2, "the congestion control mechanism is implemented by software executed by the processor 206" (Column 3, lines 11-13).

Referring to claim 19, refer to the rejection of claim 1. Furthermore, as shown in Figure 2, the system comprises a storage device (buffers), an output device (output to ring 102), and a processor (processor 206) programmed to repeatedly perform the method of claim 1. Refer to Column 2, lines 47-55 and Column 3, lines 1-17 and lines 37-48.

Referring to claim 26, refer to the rejection of claim 1. Chapman et al do not specifically disclose that the method can be performed by sender and receiver base stations. However, the method can be implemented in wired or wireless environments.

3. Claims 8 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,922,390 to Chapman et al in view of U.S. Patent No. 6,587,437 to Lee et al, and in further view of U.S. Patent No. 6,947,446 to LaGalbo et al.

Chapman et al do not disclose providing a forward error correction to the header of each packet.

LoGalbo et al disclose in Figure 6 a link layer header 310 with a forward error correction (FEC) field 622 that is used to indicate what kind of error correcting code was used to encode the data block 210 corresponding to the link layer header 310. Refer to Column 9, line 60 to Column 10, line 8 and Column 10, line 65 to Column 11, line 24. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include providing a forward error correction to the header of each packet. One would be motivated to do so in order to provide information about the error correcting code used for the data block in the header, so that the transmitting and receiving side will be able to detect errors using information from the packet header.

4. Claims 9, 10 and 34-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,922,390 to Chapman et al in view of U.S. Patent No. 6,587,437 to Lee et al, and in further view of U.S. Patent No. 6,937,600 to Takagi.

Referring to claims 9, 34 and 35, Chapman et al do not disclose that marking the header of some of the multiple packets with an impending congestion indication

comprises: flagging CE (Congestion Experienced) bits in the header of some of the multiple packets and flagging a CWR (Congestion Window Reduced) bit in the header of some of the multiple packets.

Takagi et al disclose in Figure 7 that the seventh bit of the Type Of Service field in the IP header is set as a CE (Congestion Experienced) field and in Figure 8 that the eighth bit of the Reserved field in the IP header is set as a CWR (Congestion Window Reduced) bit. Both bits are used for congestion control. The CE bit is set to "1" when the average queue length exceeds a threshold and the CWR bit is set to "1" to indicate that the window size is reduced to control congestion. Refer to Column 13, line 30 to Column 14, line 36. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include that marking the header of some of the multiple packets with an impending congestion indication comprises: flagging CE (Congestion Experienced) bits in the header of some of the multiple packets and flagging a CWR (Congestion Window Reduced) bit in the header of some of the multiple packets. One would be motivated to do so in order to notify the transmitter or receiver side that the system is congested (CE) and that the window is being reduced to control the congestion (CWR) , thereby facilitating data transmission.

Referring to claims 10 and 36, Chapman et al do not disclose that returning acknowledgements comprise flagging an ECE (Explicit Congestion Notification Echo) bit in the acknowledgements.

Takagi discloses in Figure 8 that the ninth bit of the Reserved field in the TCP header is set as an ECN-echo bit. When the reception side receives a TCP/IP packet

with the CE bit set to "1", it transmits a TCP ACK packet with the ECN-echo bit set to "1". When the transmission terminal receives the TCP ACK with the ECN-echo bit set to "1", it reduces its window size to control congestion. Refer to Column 13, line 30 to Column 14, line 36. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include that returning acknowledgements comprise flagging an ECE (Explicit Congestion Notification Echo) bit in the acknowledgements. One would be motivated to do so in order to notify the transmission terminal that the reception terminal is aware of the congestion and the transmission terminal will begin window reduction accordingly.

Allowable Subject Matter

5. Claims 4-7, 15-18, 22-25 and 30-32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

6. Applicant's arguments filed May 9, 2006 have been fully considered but they are not persuasive.

Referring to the argument that Chapman et al do not disclose an impending congestion indication (page 11, line 19 to page 12, line 13): As shown in Figure 2, "the control unit 200 of node 104 is operative to *detect and foresee congestion* at the node 104, in response to which it will generate a control signal" (Column 5, lines 12-15). The control signal "generated by control unit 200 takes the form of a congestion stamp applied to a control packet released from the node 104 to the transport ring 102", and

each control packet has a congestion notification field. Any intermediate node along the path can set the bits in the congestion notification field of a control packet to "congested", "thus indicating that congestion is being experienced or *is being forecasted* at the intermediate node". Refer to Column 5, lines 21-32. Furthermore, by "estimating the network data occupancy level, *congestion at the node can be effectively foreseen and controlled*" (abstract, lines 11-13). Therefore, the congestion notification field is used for forecasting congestion, which is impending congestion.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christine Ng whose telephone number is (571) 272-3124. The examiner can normally be reached on M-F; 8:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu can be reached on (571) 272-3155. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

C. Ng CN
July 10, 2006

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